



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/601,938

06/23/2003

Krishna K. Nair

9180-29

7585

20792

7590

02/24/2005

MYERS BIGEL SIBLEY & SAJOVEC

PO BOX 37428

RALEIGH, NC 27627

EXAMINER

MENZ, DOUGLAS M

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A.

Office Action Summary

Application No.

10/601,938

Applicant(s)

NAIR ET AL.

Examiner

Douglas M. Menz

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 45-57, 94 and 97 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 45-57, 94 and 97 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>6/14/04, 8/6/04, 6/24/03</u> | 6) <input checked="" type="checkbox"/> Other: <u>Search History</u> . |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Species II, claims 45-57, 94 and 97, in the reply filed on 2/4/05 is acknowledged.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 51 and 54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 51 recites the limitation "the seed **layer**" in line one. There is insufficient antecedent basis for this limitation in the claim. However, for examination purposes, the examiner will interpret the "the seed **layer**" of claim 51 to be the "a seed" of claim 50.

Claim 54 recites the limitation "the conductive barrier layer" in line two. There is insufficient antecedent basis for this limitation in the claim. However, for examination purposes, the examiner will interpret "the conductive barrier layer" as the conductive barrier layer between the conductive shunt layer and the solder layer as presented in the later claim 55.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 45-56, 94 and 97 are rejected under 35 U.S.C. 102(e) as being anticipated by Datta et al. (US 6853076).

Regarding claim 45, Datta discloses an electronic structure comprising:

a conductive pad (14) on a substrate (12)(Figs. 1-9);

an insulating layer (18 and 20) on the substrate and on the conductive pad, the insulating layer having a via (22) therein so that a portion of the conductive pad opposite the substrate is free of the insulating layer (Figs. 2-6);

a conductive shunt layer (28) on the portion of the conductive pad free of the insulating layer, on sidewalls of the via (22), and on surface portions of the insulating layer (20) surrounding the via opposite the substrate and the conductive pad, wherein the conductive shunt layer has a thickness of at least approximately 0.5um (Figs. 4-9 and Col. 3, lines: 55-65); and

a solder layer (38) on the conductive shunt layer wherein the conductive shunt layer and the solder layer comprise different materials (Fig. 9 and Cols. 3-5).

Regarding claim 46, Datta further discloses wherein the solder layer (38) has a rounded surface opposite the conductive shunt layer (28) having the thickness of at least approximately 0.5um (Fig. 9 and Cols. 3-5)).

Regarding claim 47, Datta further discloses wherein the conductive shunt layer (28) has a thickness of at least approximately 1.0um (Col. 3, lines: 55-65).

Regarding claim 48, Datta further discloses wherein the conductive shunt layer (28) has a thickness in the range of approximately 1.0um to 5.0um (Col. 3, lines: 55-65).

Regarding claim 49, Datta further discloses wherein the conductive shunt layer (28) comprises copper (Col. 3, lines: 55-65).

Regarding claim 50, Datta further discloses a seed layer (26) between the conductive shunt layer (28) and the conductive pad (14) and between the conductive shunt layer (28) and the insulating layer (20)(Figs. 4-9 and Col. 3, lines: 25-55).

Regarding claim 51, Datta further discloses wherein the seed layer (26) comprises an adhesion layer of a material different than that of the conductive shunt layer (28) (Figs. 4-9 and Col. 3, lines: 25-65).

Regarding claim 52, Datta further discloses wherein the adhesion layer (26) comprises titanium, tungsten, chrome and/or combinations thereof (Figs. 4-9 and Col. 3, lines: 25-55).

Regarding claim 53, Datta further discloses wherein the seed layer comprises a plating conduction layer on the adhesion layer opposite the substrate, wherein the plating conduction layer and the conductive shunt layer comprise a common material (Col. 5, lines: 4-10).

Regarding claim 54, Datta further discloses wherein the conductive shunt layer (28), the conductive barrier layer (30), and the solder layer (38) are on portions of the seed layer (26), and wherein portions of the seed layer are free of the conductive shunt layer, the conductive barrier layer, and the solder layer (Fig. 9).

Regarding claim 55, Datta further discloses a conductive barrier layer (30) between the conductive shunt layer (28) and the solder layer (38) wherein the conductive shunt layer and the barrier layer comprise different materials (Fig. 9 and Col. 3, line 55 – Col. 4, line 30).

Regarding claim 56, Datta further discloses wherein the conductive barrier layer (30) comprises at least one of nickel, platinum, palladium, and/or combinations thereof (Col. 4, lines: 1-30).

Regarding claim 94, Datta further discloses a conductive barrier layer (30) on the conductive shunt layer (28) opposite the conductive pad (14) and the insulating layer wherein the conductive barrier layer comprises at least one of nickel, palladium, platinum and/or combinations thereof, wherein the solder layer (38) and the barrier layer (28) comprise different materials (Fig. 9 and Cols. 3-5).

Regarding claim 97, Datta further discloses wherein the conductive shunt layer (28) comprises a layer of copper having a thickness of at least approximately 0.5um (Col. 3, lines: 55-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Datta et al. (US 6853076) in view of Murakami (US 6320262).

Regarding claim 57, Datta discloses the structure of claim 45 as mentioned above, however, Datta does not explicitly disclose further comprising:

a primary conductive trace on the substrate so that the primary conductive trace is between the substrate and the insulating layer; and

an electrical coupling between the primary conductive trace and the conductive pad, the electrical coupling providing at least two separate current flow paths between the primary conductive trace and the conductive pad.

Murakami discloses bond pad wiring structure which has a primary conductive trace (13) which is electrically coupled between the primary conductive trace (13) and the conductive pad (10), the electrical coupling providing at least two separate current flow paths (14) between the primary conductive trace (13) and the conductive pad (10)(Figs. 1-2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include Murakami's bond pad device with Datta's structure for the purpose of improving the reliability of the wiring as taught by Murakami (Col. 2, lines: 25-35).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patents 6622907 and 6162652 both disclose characteristics relevant to applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM

B. WILLIAM BAUMEISTER
PRIMARY EXAMINER

